REMARKS

1. Claims 11-23 are pending.

2. Examiner has rejected claims 11, 15-17 and 23 under 35 U.S.C. 103(a) as being unpatentable over JP 2-87472 (" JP 472"). Examiner has rejected claims 12 and 14 as being unpatentable over JP 472 and Ruhl. Examiner has distinguished JP 472 and the subject matter of the aforementioned rejected claims on the basis that JP 472 does not teach or disclose polygonal elements having parallel edges, and because JP 472 does not teach gaps between the elements having the maximum surface area percentages taught by the aforementioned claims. However, Examiner has taken the position such differences are merely obvious matters of choice for one skilled in the art. In Examiner's last office action, Examiner stated that:

(a) "...the Examiner's statements with regard to changing the shape of the dots from circles to hexagons remains applicable. It is still believed that such a change in shape is a matter of design choice. **Applicant is invited to make a showing that hexagonal or polygonal elements perform unexpectedly better than circular elements**, i.e. that the polygonal shape of the elements is critical to the practice of the present invention."; and

(b) " It is acknowledged that the manipulation of the size of the gaps involves optimization between potentially conflicting factors. However, it is submitted that there would be reasonable expectation of success in making the gap area less than 5% of the total area. Further, Applicant's statements implies that such small gaps would provide a prohibitively large resistance to gas diffusion. **However, as set forth in the previous Office action, the electrode elements per se of the reference are not inherently non-porous (i.e., the gas can reach the interface both *through* and *around* the electrode elements). As such, it is not apparent that one skilled in the art would weigh this factor heavily when considering optimization of the electrode elements of the reference**" (Examiner cited 2004/0180252 to Wortmann as evidence showing that PVD-produced electrode layers are not inherently non-porous).

3. Applicant respectfully seeks to traverse Examiner's position with respect to these two points. When considering the following remarks, Applicant submits that it is important to

acknowledge that the present application and JP 472 are directed to solve different problems. The present application is directed not to increasing the porosity of a given electrode to boost efficiency, but rather to improving the bond between said electrode and the electrolyte and to improving the mechanical strength of said electrode to permit increased thermal cyclic capability. (see paragraphs [0006] – [0008] of the specification present application). In contrast, JP 472 is directed to improving the porosity of a given electrode to improve "efficiency of the power generation". JP 472 states that "the porosity of the electrodes is sufficiently increased without reducing the strength thereof, thereby improving the efficiency of the power generation". In other words, the improved electrode of JP is more porous but is not stronger than a comparable monolithic electrode.

4. Examiner has invited Applicant to explain the significance and importance of polygonal, and hexagonal shapes in comparison to circular elements. Applicant points to the specification of the present application to make such showing:

(a) polygonal shapes permit the maximum number of elements to be packed into a two-dimensional plane [para 0013]. It is geometrically impossible to fit the same number of circular elements having comparable coverage (surface area) into the same two-dimensional area;

(b) in addition to maximizing the coverage in the two dimensional space, the present application teaches that specific regard must be had to the shape of the elements to reduce stress loading. See paragraph 0013 where it is stated that "A large corner angle is important to reduce the stress concentrations at the corners of the elements, and thus reduce the probability of cracking and peeling. Thus, a hexagon with a corner angle of 120 degrees will be more stable than a square having a corner angle of 90 degrees or a triangle having a corner angle of 60 degrees";

(c) a polygonal configuration is also beneficial in minimizing production deficiencies. See paragraph 0015 where it is stated that "The hexagonal pattern is also more forgiving of slight mismatches between the elements than other geometric patterns, such as squares, caused by movement during sintering and thermal cycling of the cell, while maintaining the maximum active area of the electrode"; and

(d) a polygonal pattern allows the minimization of gaps between the elements [para 0015].

It is respectfully submitted that while these advantages which were discovered through experimentation and testing by the Applicant may appear obvious in hindsight, they are not mere obvious design choices.

5. Examiner has pointed to Wortmann as evidence that that PVD-produced electrode layers are not inherently non-porous. Close examination of Wortmann reveals that Wortmann does not teach that PVD produced electrode layers are inherently porous, but rather Wortmann teaches that a layer having a porosity gradient may be created by "varying deposition conditions" [para 0023]. There is no suggestion in Wortmann as to what porosity levels would be expected with vapour deposited electrode materials such as lanthanum cobaltite. In fact, JP 472 identifies the adjustment of thermal spraying conditions of electrode materials as a problem with the prior art because the adjustment results in decreased electrode strength and increased electrical resistance, and therefore JP 472 appears to teach away from the variable deposition process of Wortmann. Thus, referring to the specification of JP 472, the declaration of the Applicant previously submitted, and to Wortmann, it is apparent that the elements of the reference while maybe not completely non-porous, would be expected to have low porosity thereby necessitating sufficiently sized gaps to enable adequate gas diffusion to the triple phase boundary. As previously submitted, Applicant respectfully submits that gaps minimized to 5% of the surface area of the reference electrode would result in an impractically compromised electrode.

6. It is respectfully submitted that for the reasons discussed above the polygonal elements of independent claims 11, 12 and 15 having the specified amounts of gaps, are not obvious in light of JP 472 and as such should be allowed. It is further submitted that all dependent claims thereto should accordingly be allowed.

CONCLUSION

In view of the foregoing remarks and amendments, it is respectfully submitted that this application is in a condition for allowance and allowance thereof is respectfully requested.

Respectfully submitted,

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Attachments:

1. Petition for 3-Month Extension
2. Credit Card Payment Form